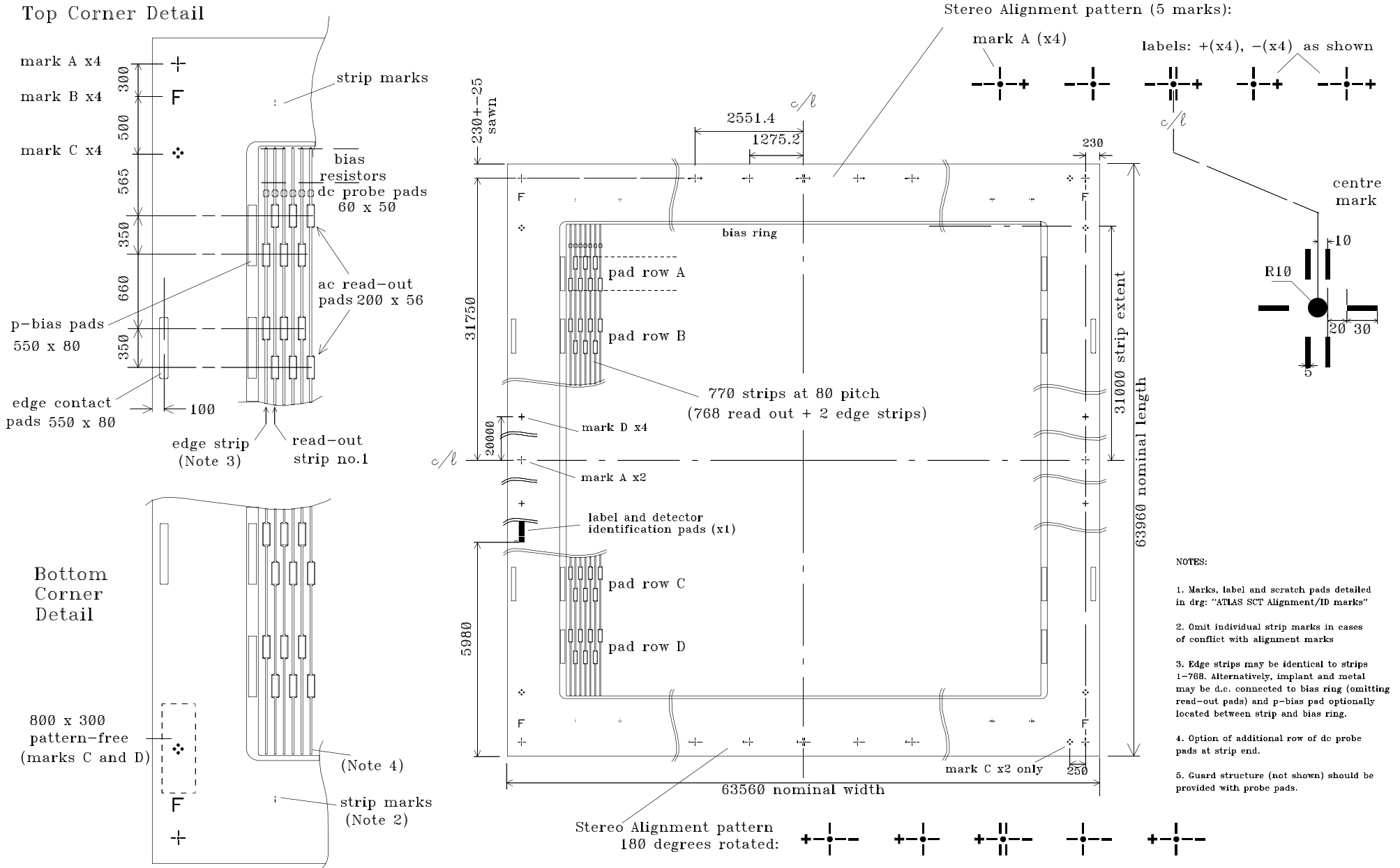


New Short Strip Sensors From Hamamatsu

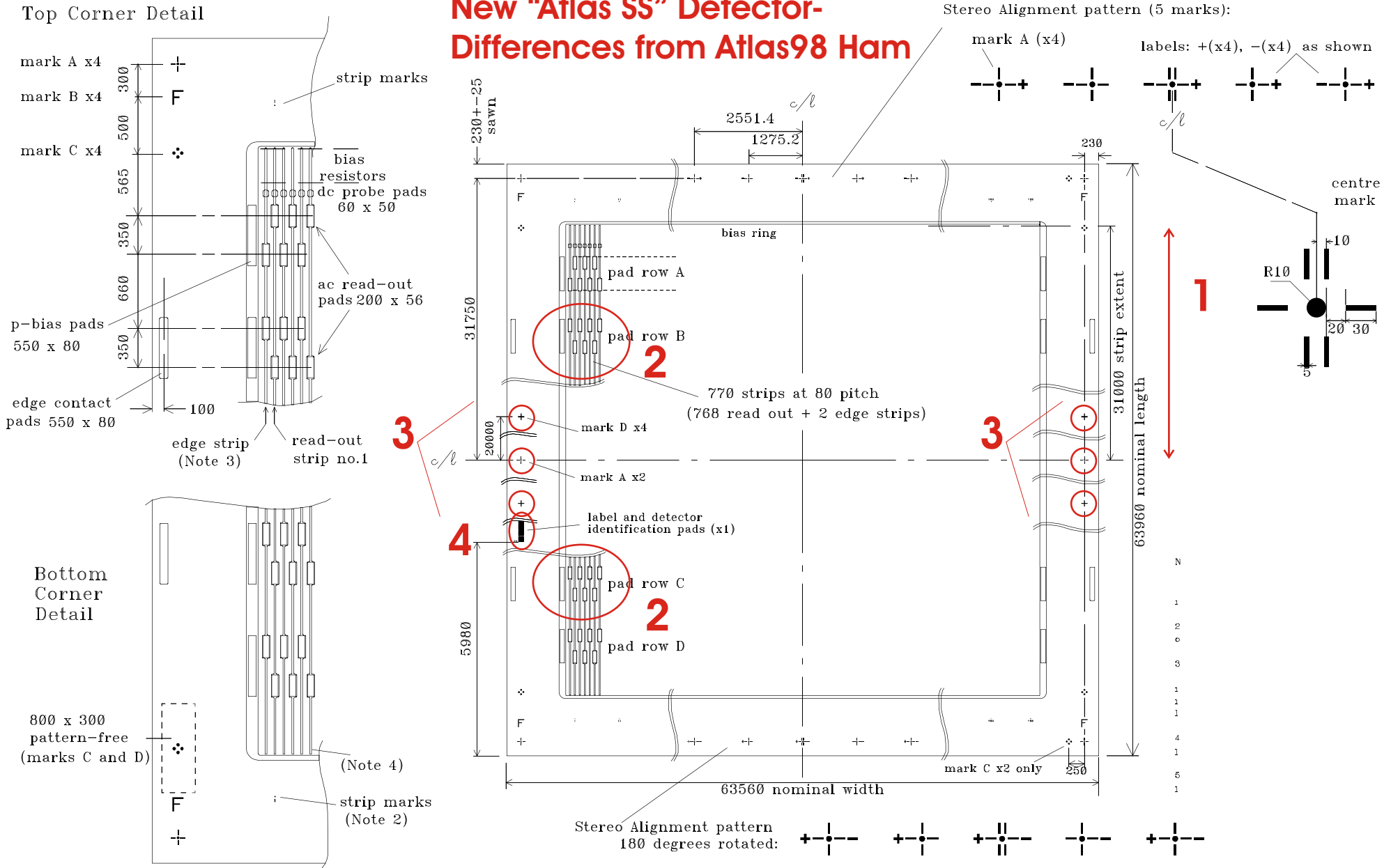
- *Qty = 100 ordered*
- *Design based upon current Atlas SCT sensors, only shorter*
- *Delivery expected mid October*

Original Hamamatsu Atlas Detector ("Atlas98 Ham" is label on detector)



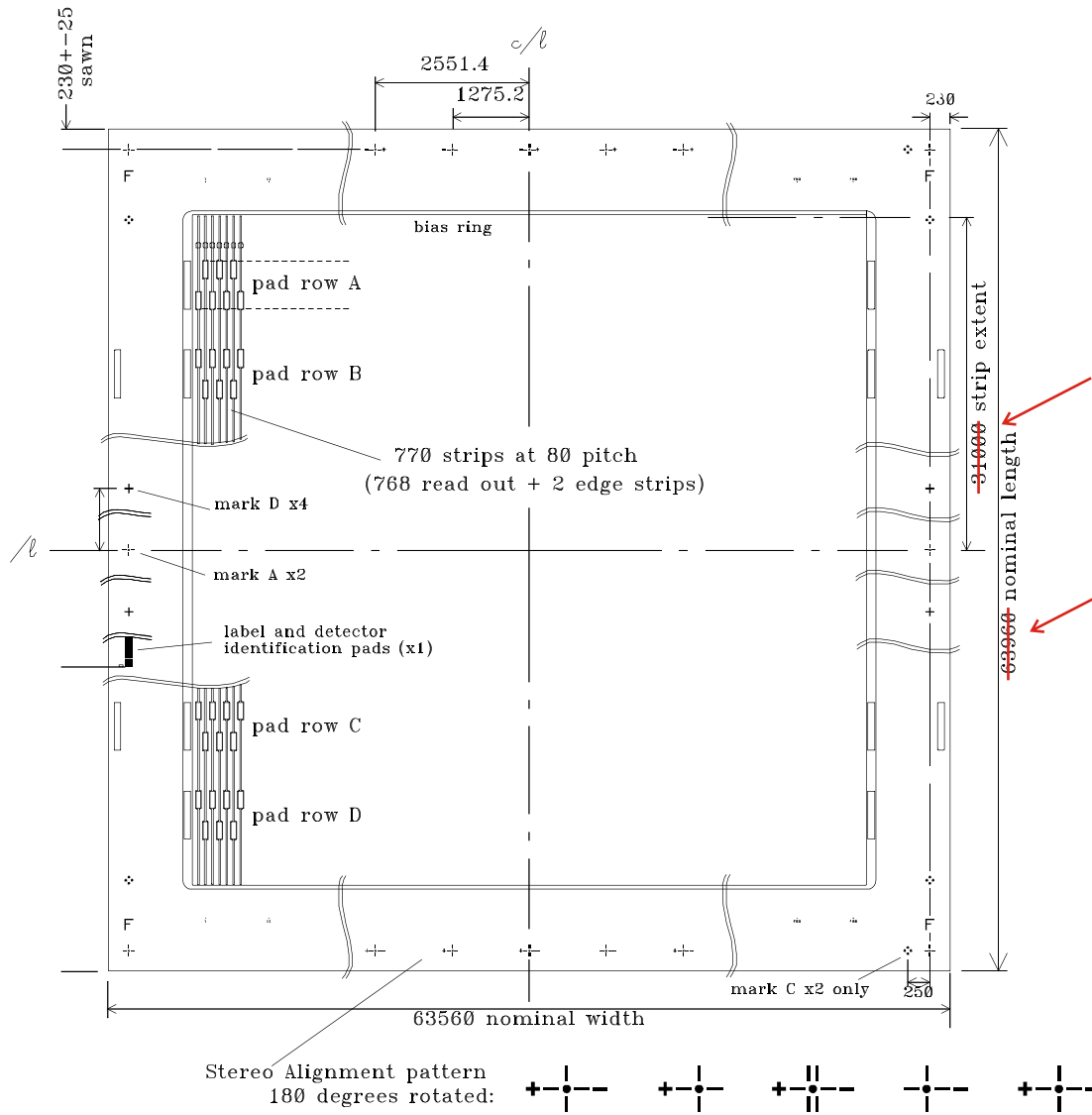
Title	Version	Date	Drawn by (Cadence)	Checked by	Dimensions	Tolerances	Scale	Amended
ATLAS SCT BARREL	003	19 DEC.2000	G.A.Beck, QMW	D.R.	μm	Lithographic: ± 3 μm Sawn: ± 25 μm	NOT TO SCALE	

New "Atlas SS" Detector- Differences from Atlas98 Ham



Keep geometry the same except: 1. Strips are shorter 2. Distances of pad row B from row A will change (similarly pad row C from D). 3. Because strips are shorter we need to specify locations of fiducials circled in red. 4. Need less detector ID pads (8 bits probably enough: Hamamatsu can choose)

1. New strip length



15000 um (1/2) strip extent

31960 um nominal length

2. Pad row B move further from pad row A (location of pad row A from detector edge remains the same). Pad row C moves to the same distance [3.15 mm] from pad row D. (Location of pad row D from detector edge remains the same).

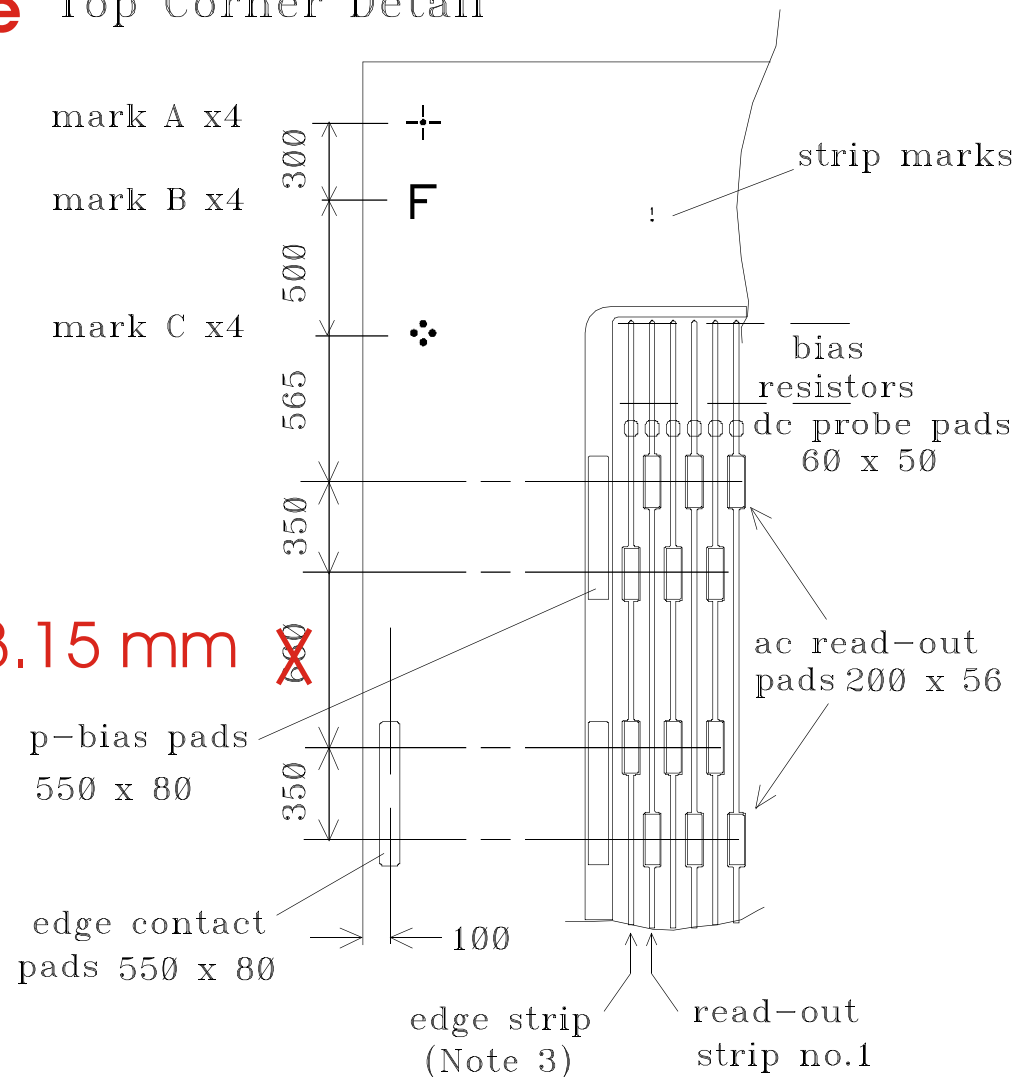
-Distance shown increases from 660 microns to 3.15 millimeters

-Note: no longer drawn to scale

3.15 mm



Top Corner Detail



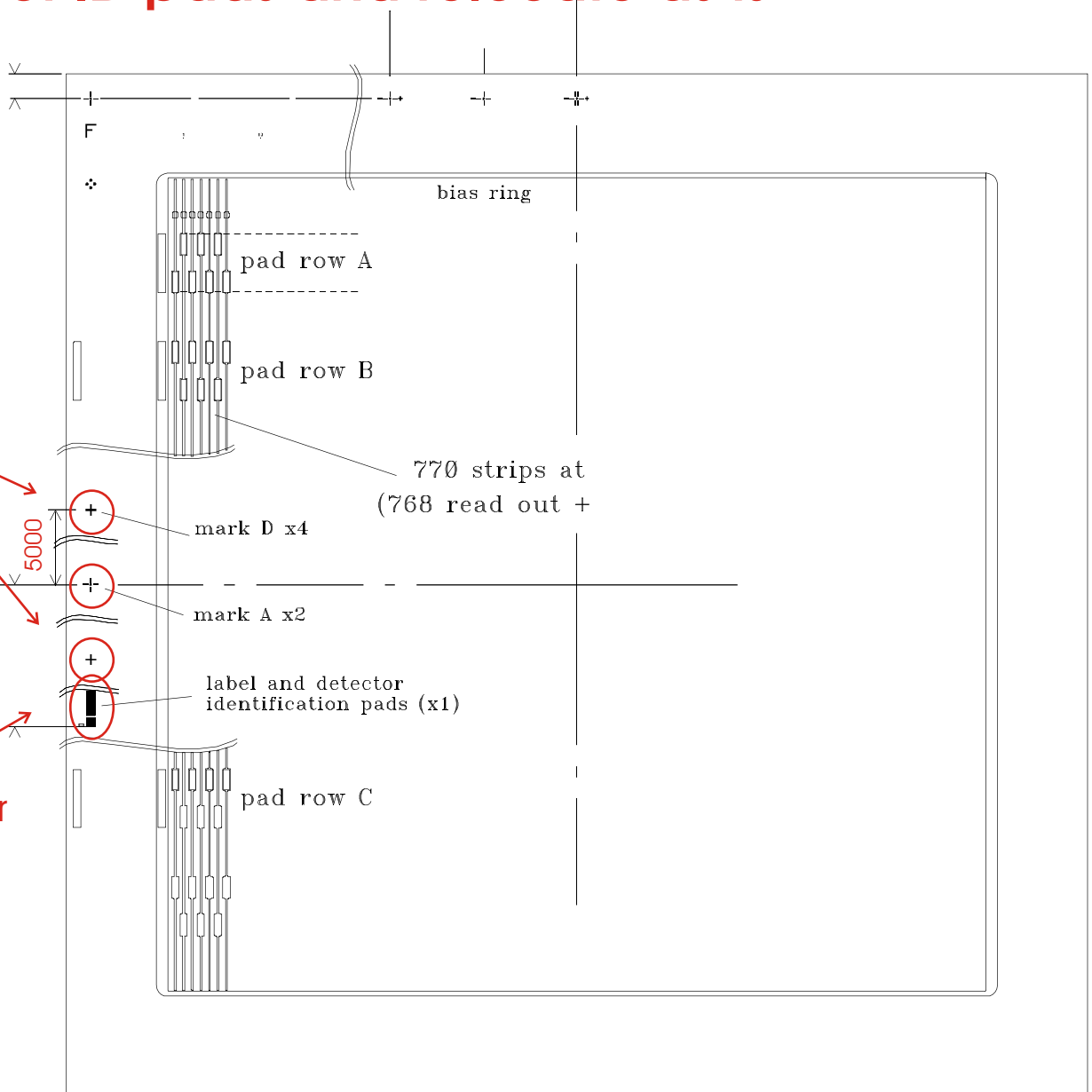
3. Indicated fiducial have the locations shown.

4. Decrease number of ID pads and relocate as is appropriate.

These two marks are 5000 um from center line

This fiducial mark remains on center line

Reduce number of ID pads and relocate



Some small differences between new and old detectors

Strip Length	~ 3 cm	~ 6 cm
$V_{\text{depletion}}$	< 120 V	< 150 V
C_{Coupling}	50pF/cm	20pF/cm
C_{inter}	1.6 pF/cm (nom)	< 1.1 pF/cm
I_{total}	<500 nA@ 350V	<6 uA@ 150V
	<10 uA@ 500V	<20 uA@ 350V
Thickness	320 um	260 um (B1 dets) 285 um (B2 dets)

Why?

**Part of the new test procedure involves Hamamtsu providing us the thickness of each wafer>*

Official Specifications-I

Specification of ATLAS-Z-SSSD 5654

Wafer specifications:

n-type silicon, p+ strips, n+ backplane
crystal orientation <100>
320 um thickness +/- 15 um
wafer warp < +/- 100um

General ratings

Chipsize:	63560 ± 40 x 31960 ± 40	um
Active area:	61650 x 29870	um
Number of strips:	768 + 2	ch
Strip length:	29840	um
Strip pitch:	80	um
Strip P+ width:	16	um
Strip AL width:	22	um

inspections and specs.

Official Specifications-II

Inspections:
(/detector)

- ① I-V characteristics (0-500V) of P bias .
- ② C-V characteristics(0-150V)
and estimated full depletion voltage (Vfd).
- ③ NG channels.
Coupling capacitor short at 120V.
AC AL open.
AC AL short.
DC NG(Implant open , Implant short ,
Poly-Si short , Poly-Si open ,
Bad isolation , Leaky strip)

(/LOT)

- ④ The value of Poly-Si resistors
(Measurement from one detector per batch,
Measurement on test structures.)
- ⑤ Coupling Capacitance *1
- ⑥ Interstrip Capacitance *1
*1 : 2chip/LOT, 3measurement point/chip
- ⑦ Load Capacitance(1chip/LOT)

Vfd:	<120	V
NG channels:	<1%	(8ch max)
Id@350V:	<500	nA
Id@500V:	<10	uA
dI/dV:	<100	nA/50V (Vr=350-400)
Poly-Si-R:	1.25±0.75	Mohm
Coupling Capacitance:	50pF/cm	nominal
Interstrip Capacitance:	1.6pF/cm	nominal
Load Capacitance:	<2pF/cm	

Testing Plan--Discuss